Global Hydrology Resource Center

Data User Guide

GPM Ground Validation Autonomous Parsivel Unit (APU) HyMeX

Introduction

The GPM Ground Validation Autonomous Parsivel Unit (APU) HyMeX. The APU, an optical disdrometer based on single particle extinction, measures particle size and fall velocity. The tarred file, which consist of ASCII encoded data files, contain information about the drop size distribution, precipitation rate, reflectivity, and mass-weighted mean diameter. This dataset was collected during the HYdrological cycle in Mediterranean EXperiment (HyMeX) campaign, which took place in from September 5 to November 6, 2012.

Citation

Petersen, Walter A., Ali Tokay, Patrick. N. Gatlin, and Matthew Wingo. 2015. GPM Ground Validation Autonomous Parsivel Unit (APU) HyMeX [indicate subset used]. Dataset available online [ftp://gpm.nsstc.nasa.gov/gpm_validation/related_projects/hymex/parsivel/] from the NASA EOSDIS Global Hydrology Resource Center Distributed Active Archive Center, Huntsville, Alabama, U.S.A. doi: http://dx.doi.org/10.5067/GPMGV/HYMEX/DATA301.

Keywords:

GHRC, GPM GV, HyMeX; Mediterranean, Alés, France, Rome, Italy; parsivel, optical disdrometer; reflectivity, drop size distribution, rainfall rate, mean diameter;

Campaign

The Global Precipitation Measurement (GPM) mission Ground Validation (GV) campaign used a variety of methods for validation of GPM satellite constellation measurements prior to launch of the GPM Core Satellite, which launched on February 27th, 2014. The validation effort included numerous GPM-specific and

joint-agency/international external field campaigns, using state of the art cloud and precipitation observational infrastructure (polarimetric radars, profilers, rain gauges, disdrometers). Surface rainfall was measured by very dense rain gauge and disdrometer networks at various field campaign sites. These field campaigns accounted for the majority of the effort and resources expended by Global Precipitation Measurement (GPM) mission Ground Validation (GV). More information about the GPM mission is available at http://pmm.nasa.gov/GPM.

The HYdrological cycle in Mediterranean EXperiment (HyMeX) aimed to improve the understanding, quantification and modelling of the hydrological cycle in the Mediterranean, with emphasis on the predictability and evolution of extreme weather events, inter-annual to decadal variability of the Mediterranean coupled system, and associated trends in the context of global change. Furthermore, this campaign aimed to improve observational and modelling systems, better predict extreme events, simulate the long-term water-cycle, and provide guidelines for adaptation measures. Special Observation Period 1 (SOP1), which was from September 5 to November 6, 2012, was dedicated to heavy precipitation and flash-flooding. More information about HyMeX is available at http://www.hymex.org/.

Instrument Description

The GPM Ground Validation Autonomous Parsivel Unit (APU) HyMeX is a laser-based disdrometer produced by OTT Hydromet. The laser sensor in the Parsivel produces a horizontal strip of light. When no particles pass through the horizontal beam, the maximum voltage is detected at the receiver. When a precipitation particle passes through the laser beam, a portion of the beam corresponding to the particle's diameter is blocked. The blocked portion of the laser results in a reduced voltage output. This reduction in voltage can be used to determine the particle size. Particle speed can also be found by measuring the duration of signal. The signal begins as soon as a particle enters the laser beam and ends when the particle completely leaves the laser beam.

The Parsivel can also classify precipitation particles into 32 separate size classes and 32 velocity classes. Further information on the Parsivel can be found at http://www.hachhydromet.com/web.

Site # / Instrument	Site	Site Coordinates	Latitude	Longitude	Alitutde (m)
SN35	Alés, France	N44°08'13.8", E04°05'51.3"	44.137167	4.097583	150
SN36, APU, TB	Rome, Italy	N41°53'37.3", E12°29'37.8"	41.893694	12.493833	076

MRR2-2DVD co-located instruments

More detailed information about the GPM Ground Validation Autonomous Parsivel Unit (APU) HyMeX is available at: ftp://gpm.nsstc.nasa.gov/gpm_validation/related_projects/hymex/parsivel/doc/DataFormat_parsivel_hymex.pdf.

Investigators

Dr. Walter A. Petersen
Patrick Gatlin
NASA Marshall Flight Center

Matthew Wingo
NASA Wallops Flight Facility

Ali Tokay
Universities Space Research Association
Science and Technology Institute

File Naming Convention

The APU dataset files are named with the following convention:

hymex_apu[sn]_[date]_[site]_[latitude_longitude].tar

Where,

[sn] = serial number of APU platform (e.g., apu01)
[date] = YYYYmmDD (e.g., 20110422)
[site] = geographical region of APU deployment (e.g., france, italy)
[latitude_longitude]=geographic location of instrument (e.g., N363442.07_W0972640.90 is North 36°34'42.07" and West 97°26'40.90")

Data Format Description

The GPM Ground Validation Autonomous Parsivel Unit (APU) HyMeX data are available in ASCII format. The data processing level for the raw files is 1A and the drop count, drop size distribution, integral parameters, and event summaries data files are level 3. More information about NASA data processing levels can be found at http://science.nasa.gov/earth-science/earth-science-data/data-processing-levels-for-eosdis-data-products/.

References

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2015. HYdrological cycle in Mediterranean EXperiment (HyMeX) website: http://www.hymex.org/

Contact Information

To order these data or for further information, please contact:

Global Hydrology Resource Center
User Services
320 Sparkman Drive
Huntsville, AL 35805
Phone: 256-961-7932
E-mail: support-ghrc@earthdata.nasa.gov
Web: https://ghrc.nsstc.nasa.gov/